

# OPERATING SUMMARY

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# EGANVILLE

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EGANVILLE

**WATER POLLUTION CONTROL PLANT**

and

**WATER SUPPLY SYSTEM**

MINISTRY OF THE ENVIRONMENT

1973 ANNUAL OPERATING SUMMARY



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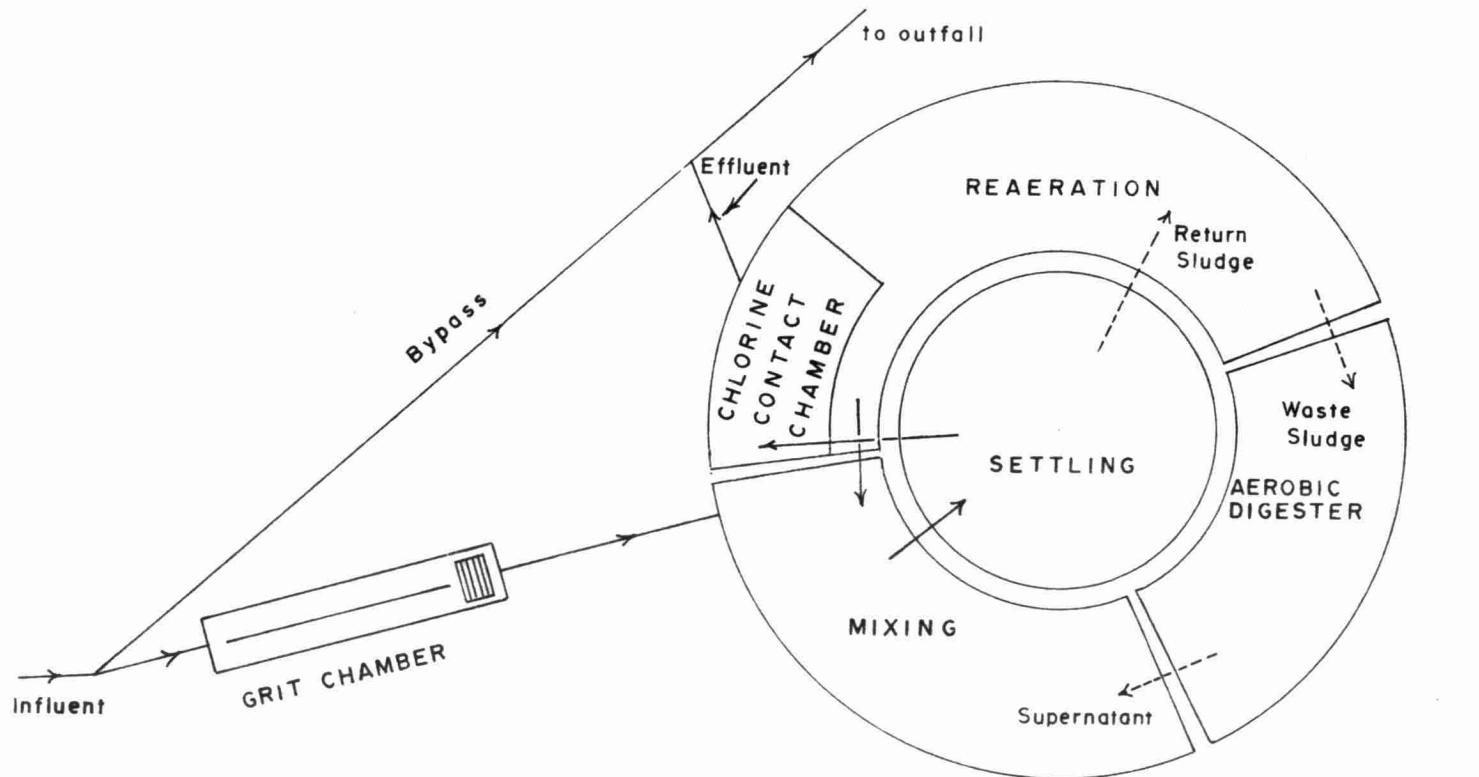
### WATER POLLUTION CONTROL PLANT

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### WATER TREATMENT PLANT

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# **WATER POLLUTION CONTROL PLANT**



EGANVILLE  
WATER POLLUTION CONTROL PLANT

## DESIGN DATA

PROJECT NO. 1-0007-66  
TREATMENT Extended Aeration  
DESIGN FLOW 0.168 mgd  
BOD - Raw Sewage  
- Domestic 182 mg/l  
- Creamery 154 mg/l  
Removal 80%

### PRIMARY TREATMENT

#### Grit Removal

Type: Parallel channels, manually cleaned  
Size: Two 17'4" x 1'2"

#### SCREENING

Type: Manually cleaned  
Size: 1 $\frac{1}{4}$ " openings

#### COMMINUTION

Type: Aer-o-Flow Type A-12

### SECONDARY TREATMENT

#### Aeration Tanks

Type: Diffused air  
Size: 83,400 gal  
Retention: 12 hours

#### Air Supply

Type: Dresser type RAI  
Size: Three-340 scfm @ 7 psi

### SECONDARY SEDIMENTATION

Size: 25'8" dia x 15' (37,500 gal)  
Retention: 5.3 hours  
Loading: Surface 388 gal/ft<sup>2</sup>/day  
Weir: 1170 gal/ft/day

#### CHLORINATION

Type: Wallace & Tiernan Type 831  
Size: 20 lbs/day

#### Chlorine Contact Chamber

Size: 3900 gal  
Retention: 30 minutes

#### OUTFALL

### OUTFALL

- to Bonnechere River

### SLUDGE HANDLING

#### Digestion System

Type: Aerobic  
Size: 56,000 gal

### PUMPING STATIONS

#### North Side

Two Flygt Model CP-3100, 350 US gpm @ 35' TDH

#### Water Street

Two Flygt Model CP-3100, 150 US gpm @ 25' TDH

# '73 Review

## GENERAL

This was the second full year of operation of the Eganville Water Pollution Control Plant. During the year a workshop/garage was added to the plant control building, doubling the size of the original building. Another set of a new type of diffusers were installed in the aeration tank in an attempt to solve problems with this equipment.

Shock loading from the Eganville Creamery continued to create process problems at the plant and extra work for the plant staff.

Sewage flows have dropped over the past two years as a result of efforts by the municipality to have roof drains, footing drains and basement sump pumps disconnected from the sanitary sewer system.

Four new services were installed, and one extension to the sewer system constructed. One sewer and two service breaks were repaired. The sewer system was checked monthly and flushed as required. Several blockages were rodded and flushed.

## PLANT PERFORMANCE AND TREATMENT DATA

Flows for the year totalled 35.0 million gallons. Daily flows averaged 96 thousand gallons as compared to 118 thousand gallons per day in 1972.

The sewage BOD, excluding high-strength spills from the Eganville Dairy, averaged 517 mg/l during 1973 as compared to 308 mg/l in 1972 and 218 mg/l in 1971. The BOD concentration was reduced by an average of 98 per cent to an effluent concentration averaging 8.7 mg/l. In 1972 the effluent BOD concentration averaged 6.1 mg/l.

The sewage suspended solids, again excluding high strength spills from Eganville Dairy, averaged 273 mg/l in 1973, 201 mg/l in 1972 and 109 mg/l in 1971. The suspended solids concentration was reduced by 94 per cent to effluent concentration of 17 mg/l. In 1972 the effluent suspended solids concentration averaged 11 mg/l.

Raw sewage BOD and suspended solids concentrations normally average 150 to 250 mg/l in other sewage treatment plants, assuming no infiltration problems in the sewer system. The increasing strength at Eganville, particularly in 1973, is believed to be attributable entirely to the Dairy as there are no other known potential sources of high strength wastes.

Phosphorus was reduced by 43 per cent in the plant, from an influent concentration averaging 14.6 mg/l to an effluent concentration averaging 8.3 mg/l. As a result of improvements in thickening of the sludge, sludge haulage totalled 88 thousand gallons in 1973, down from 393 thousand gallons in 1972. The plant effluent was disinfected with 1,760 pounds of chlorine.

#### PLANT LOADING

Flows in 1973 averaged 60 per cent of plant design capacity using the extended aeration process. Excluding high strength spills from Eganville Dairy, the BOD loading averaged 88 per cent of design in 1973, as compared to 66 per cent in 1972 and 50 per cent in 1971, based on a design loading for the extended aeration process of 566 pounds of BOD per day (306 pounds from 1,800 population equivalent plus 260 pounds from Eganville Dairy). Based on an assumed design concentration of 250 mg/l (420 pounds/day) the suspended solids loading averaged 62 per cent of plant design capacity using the extended aeration process in 1973, 57 per cent in 1972 and 34 per cent in 1971.

#### CONCLUSIONS

In the preparation of this report data accumulated since the startup of the plant was reviewed. Non-representative data reflecting short term high strength spills from Eganville Dairy was deleted in the computation of averages.

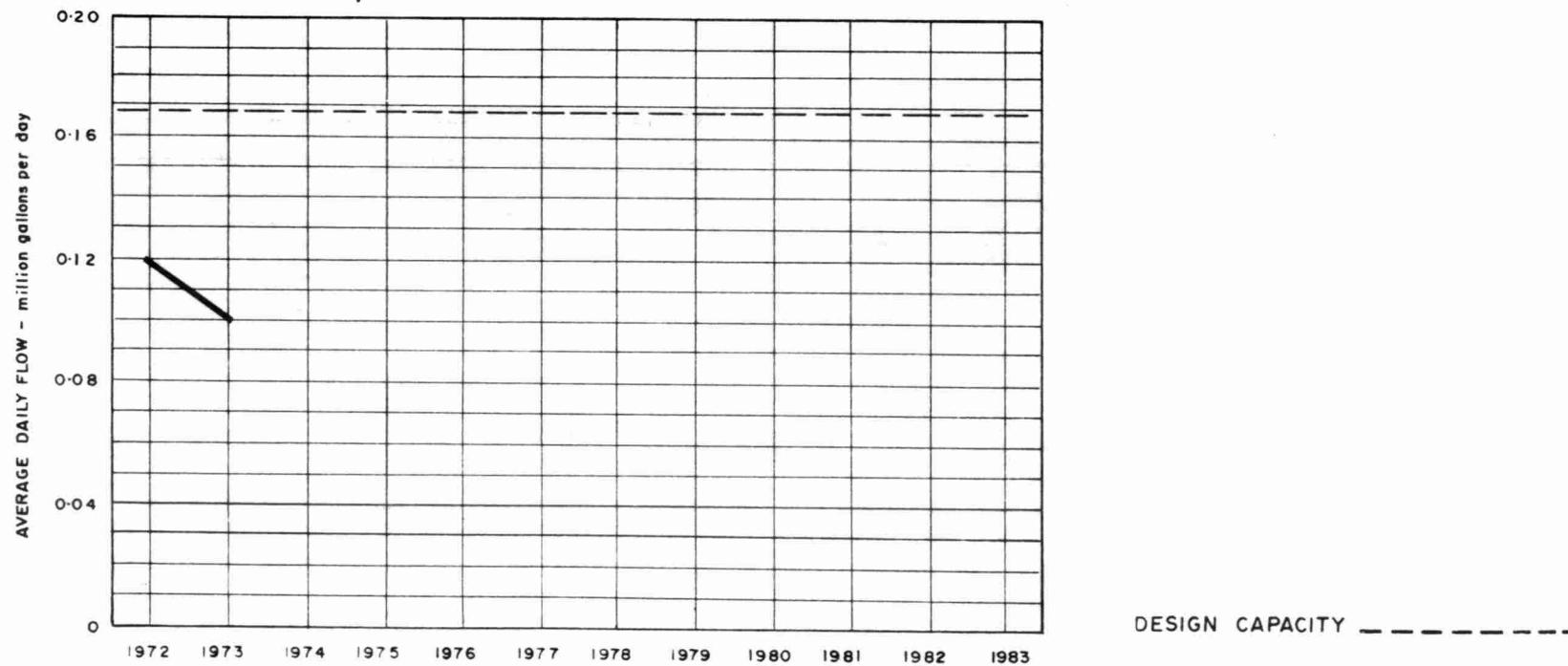
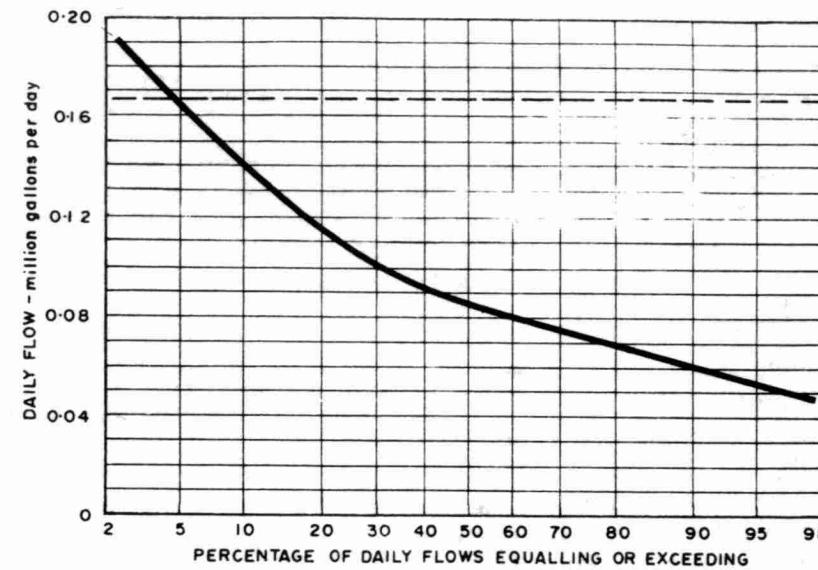
The BOD loading on the plant is rapidly approaching its design capacity using the extended aeration process. It will be necessary to convert to the contact stabilization process within the next year or two if this trend continues. This should increase the BOD capacity by approximately 50%, but will make the plant more susceptible to shock loads. We attribute this rapid increase in BOD strength and loading to the Eganville Dairy as there are no other known potential sources of high strength wastes.

The plant is operating very efficiently and continuing to produce an effluent with BOD concentrations well within Ministry of Environment requirements. As a result of heavy BOD loadings the effluent suspended solids quality has deteriorated to slightly below Ministry requirements.

The process has been upset on numerous occasions ever since startup by spills of high strength waste from the Eganville Dairy. With increasing plant loading it becomes more difficult for the process to recover from these shock loads. The spills have created a considerable amount of extra work for the plant staff. The situation has reached the point where spills can no longer be tolerated.

The plant has been operated since startup by a staff of two men who also operate the Eganville Water Plant and the sewage collection and water distribution systems. The Chief Operator, Basil Hein and his operator Gary Swant are to be commended for high standards of operation and maintenance.

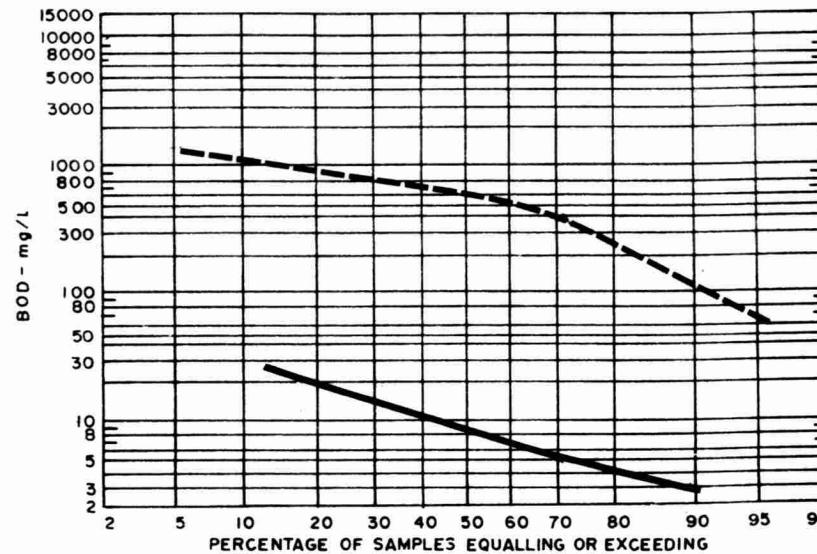
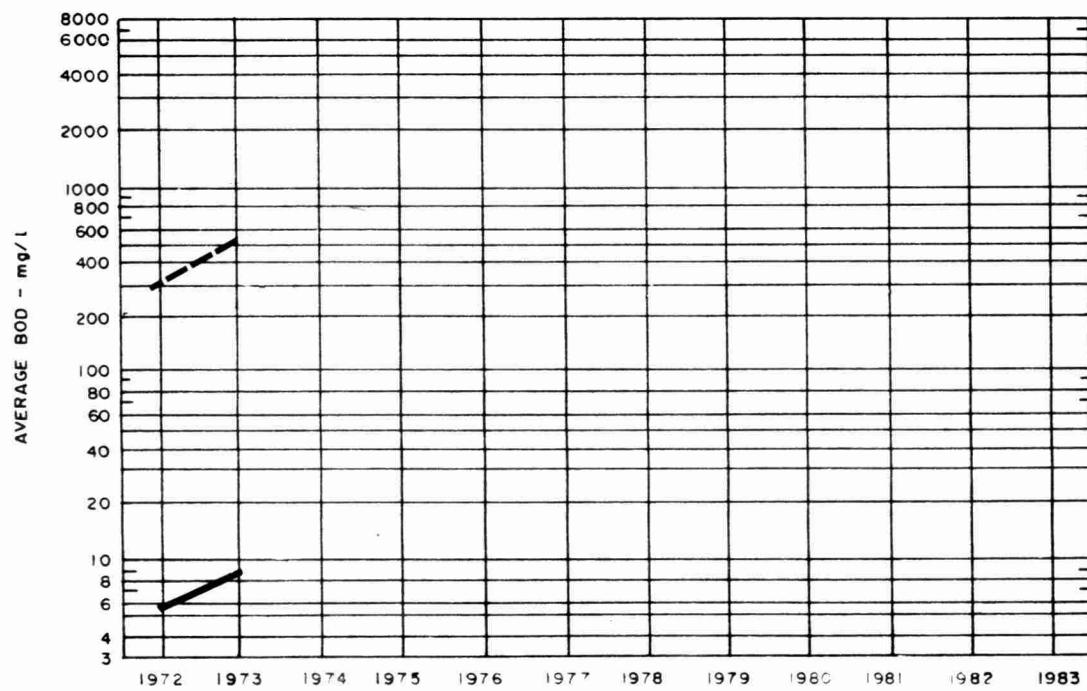
# PROCESS DATA FLOWS



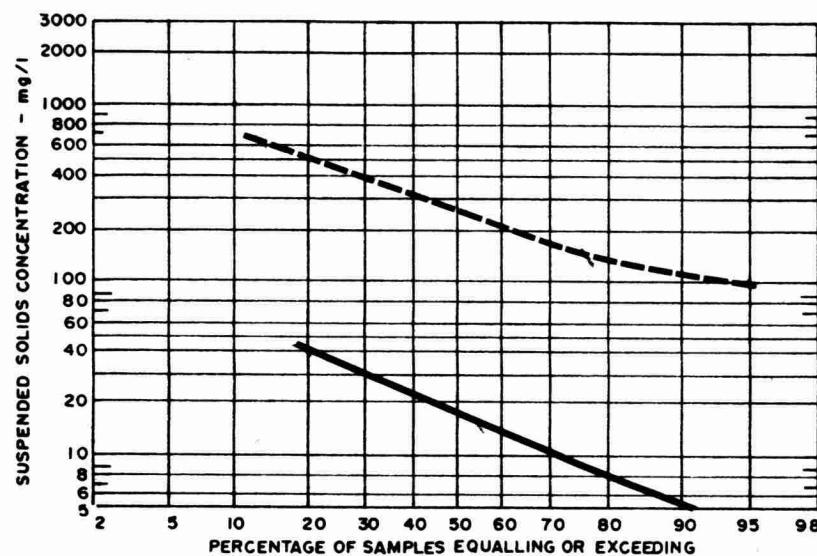
## PLANT PERFORMANCE

| MONTH                 | FLOWS                         |                            |                       | BIOCHEMICAL OXYGEN DEMAND |                  |           |                           | SUSPENDED SOLIDS |                  |           |                           | PHOSPHORUS         |                    |
|-----------------------|-------------------------------|----------------------------|-----------------------|---------------------------|------------------|-----------|---------------------------|------------------|------------------|-----------|---------------------------|--------------------|--------------------|
|                       | TOTAL FLOW<br>million gallons | AVERAGE<br>DAY<br>mil. gal | MAXIMUM<br>DAY<br>mgd | INFLUENT<br>mg/l          | EFFLUENT<br>mg/l | REDUCTION |                           | INFLUENT<br>mg/l | EFFLUENT<br>mg/l | REDUCTION |                           | INFLUENT<br>mg/l P | EFFLUENT<br>mg/l P |
|                       |                               |                            |                       |                           |                  | %         | 10 <sup>3</sup><br>pounds |                  |                  | %         | 10 <sup>3</sup><br>pounds |                    |                    |
| JAN                   | 2.93                          | 0.09                       | 0.12                  | 500                       | 8                | 98        | 12.2                      | 320              | 20               | 94        | 8.8                       | 13.2               | 8.5                |
| FEB                   | 2.44                          | 0.09                       | 0.11                  | 195                       | 4                | 97        | 4.7                       | 130              | 8                | 94        | 3.0                       | 12.5               | 10.0               |
| MAR                   | 4.63                          | 0.15                       | 0.20                  | 205                       | 17               | 91        | 8.7                       | 230              | 10               | 96        | 10.2                      | 10.3               | 5.0                |
| APR                   | 4.82                          | 0.16                       | 0.29                  | 285                       | 5                | 98        | 11.3                      | 200              | 18               | 91        | 8.8                       | 6.8                | 4.9                |
| MAY                   | 3.70                          | 0.12                       | 0.15                  | 1150                      | 14               | 98        | 42.0                      | 435              | 2                | 99+       | 16.0                      | 42.0               | 8.0                |
| JUNE                  | 3.22                          | 0.11                       | 0.13                  | 810                       | 7                | 99+       | 25.9                      | 340              | 23               | 93        | 10.2                      | 18.7               | 7.7                |
| JULY                  | 2.40                          | 0.08                       | 0.09                  | 980                       | 9                | 99        | 23.3                      | 470              | 35               | 93        | 10.4                      | 27.3               | 11.5               |
| AUG                   | 2.46                          | 0.08                       | 0.09                  | 370                       | 8                | 98        | 9.0                       | 190              | 20               | 89        | 4.2                       | 12.0               | 14.0               |
| SEPT                  | 2.36                          | 0.08                       | 0.10                  | 300                       | 4                | 99        | 7.0                       | 160              | 23               | 86        | 3.2                       | 8.5                | 10.0               |
| OCT                   | 2.21                          | 0.08                       | 0.09                  | 320                       | 2                | 99        | 7.0                       | 190              | 20               | 89        | 3.8                       | 9.4                | 7.7                |
| NOV                   | 1.87                          | 0.06                       | 0.08                  |                           |                  |           |                           |                  |                  |           |                           |                    |                    |
| DEC                   | 1.96                          | 0.06                       | 0.08                  | 300                       | 20               | 93        | 5.5                       | 190              | 10               | 95        | 3.5                       | 5.6                | 4.0                |
| <b>TOTAL</b>          | <b>35.00</b>                  | -                          | -                     | -                         | -                | -         | <b>156.6</b>              | -                | -                | -         | <b>82.1</b>               | -                  | -                  |
| <b>AVG.</b>           |                               | 0.10                       | 0.29                  | 517                       | 9                | 98        | 14.2                      | 273              | 17               | 94        | 7.5                       | 14.6               | 8.3                |
| <b>No. of Samples</b> | -                             | -                          | -                     | 20                        | 19               | -         | -                         | 20               | 19               | -         | -                         | 19                 | 19                 |

# BIOCHEMICAL OXYGEN DEMAND

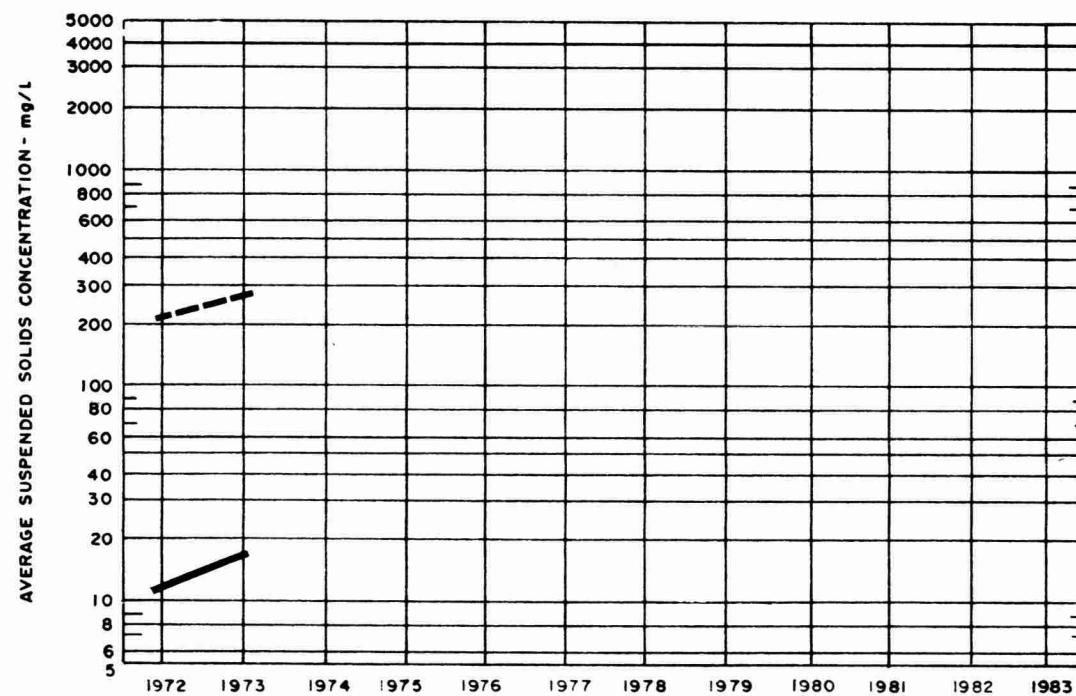


# SUSPENDED SOLIDS

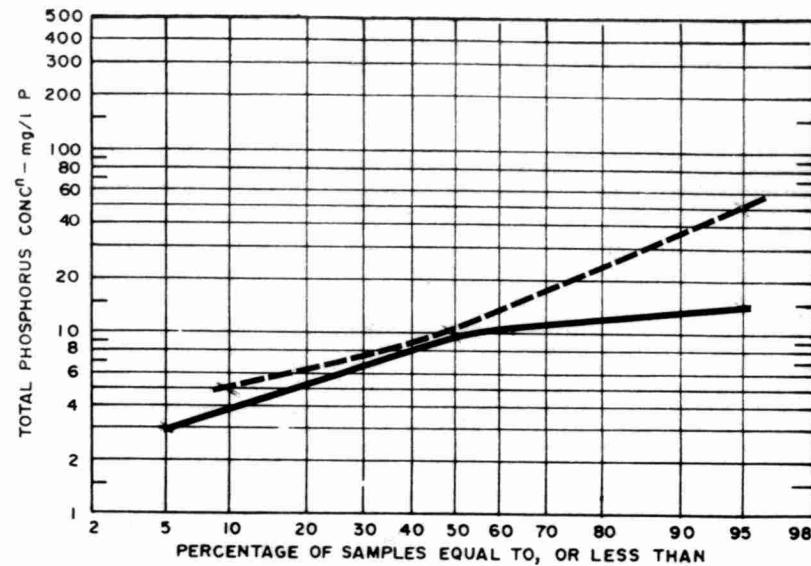
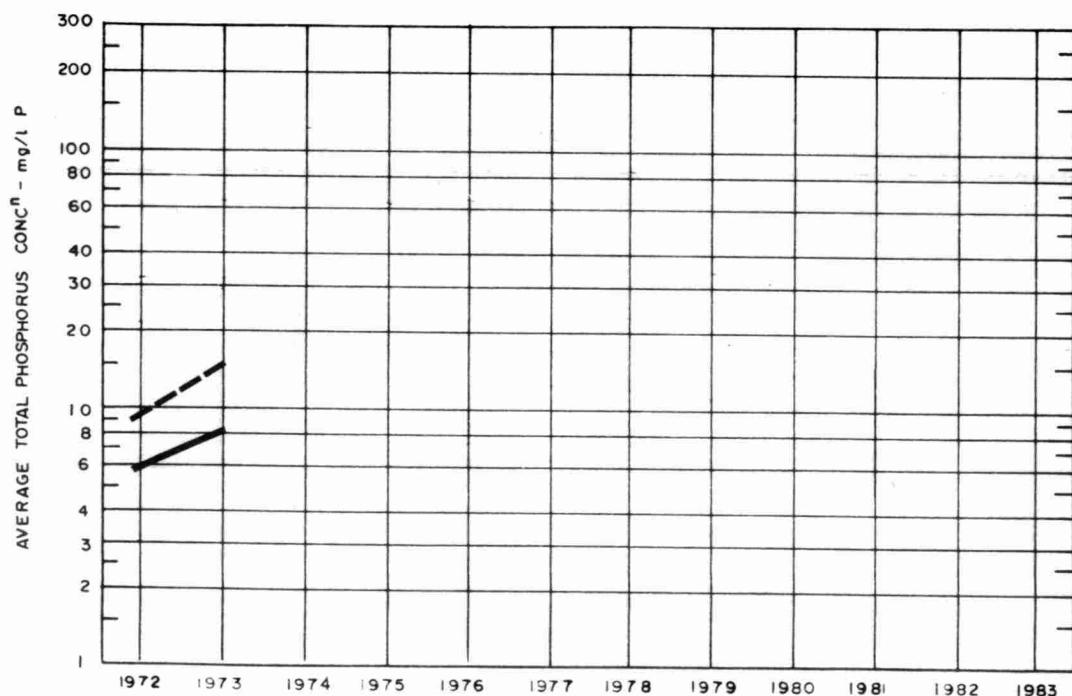


PLANT INFLUENT

PLANT EFFLUENT



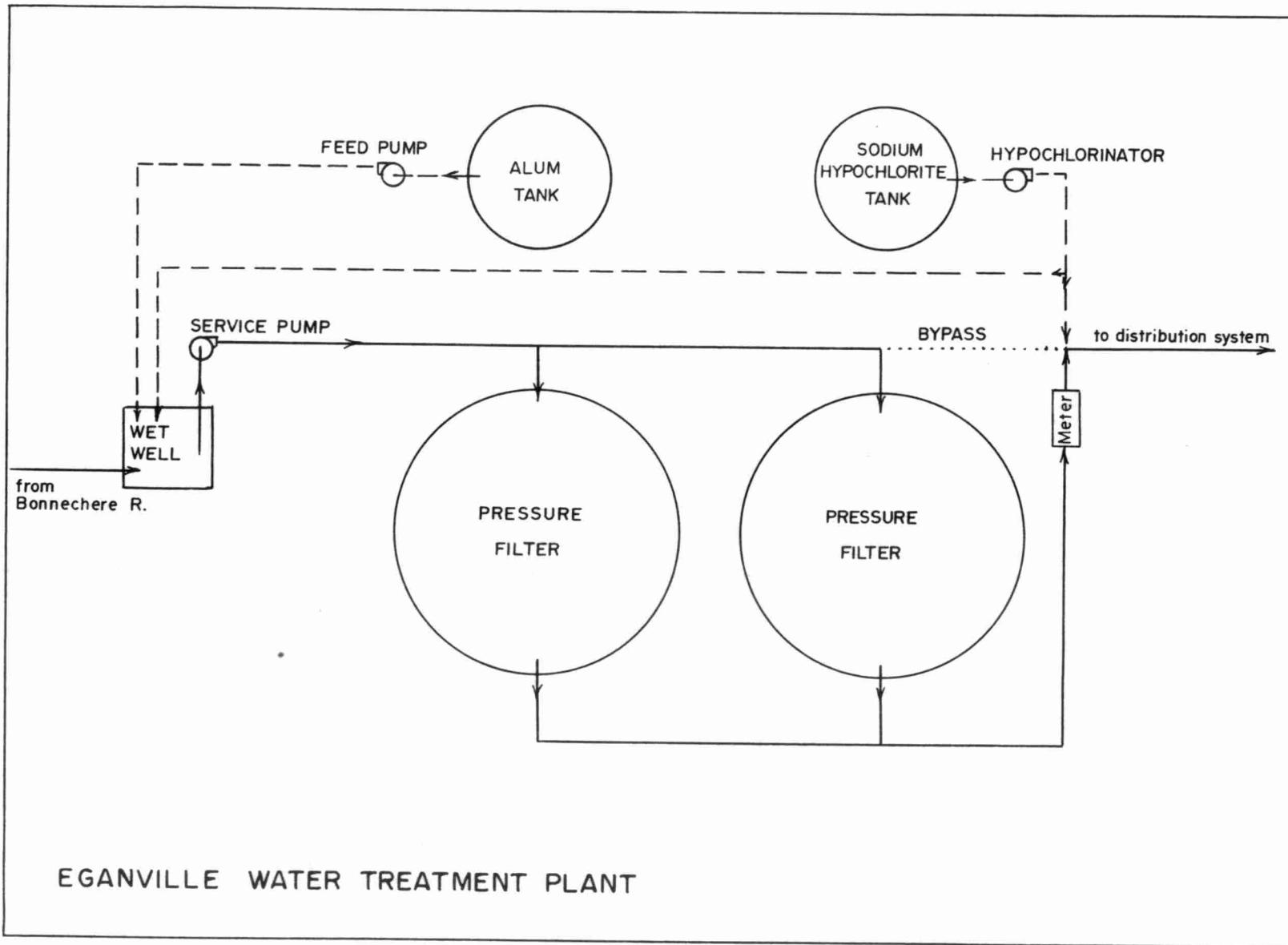
# PHOSPHORUS



## TREATMENT DATA

| MONTH        | GRIT                  | CHLORINATION         |             | AERATION   |                   |                             | WASTE SLUDGE            |                  |             | AEROBIC DIGESTER        |                  |             |               |
|--------------|-----------------------|----------------------|-------------|------------|-------------------|-----------------------------|-------------------------|------------------|-------------|-------------------------|------------------|-------------|---------------|
|              | QUANTITY REMOVED      | Cl <sub>2</sub> USED | Avg. Dosage | MLSS. CONC | F/M               | AIR USED                    | QUANTITY                | SUSPENDED SOLIDS | VOL. SOLIDS | QUANTITY REMOVED        | SUSPENDED SOLIDS | VOL. SOLIDS | AMOUNT HAULED |
|              | cubic feet            | pounds               | mg/l        | mg/l       | day <sup>-1</sup> | 1000 ft <sup>3</sup> lb BOD | 10 <sup>3</sup> gallons | mg/l             | %           | 10 <sup>3</sup> gallons | mg/l             | %           | cubic yards   |
| JAN          | 14                    | 124                  | 4.2         | 5300       | 0.06              |                             |                         | 6200             |             |                         | 6500             |             |               |
| FEB          | 11                    | 97                   | 4.0         | 5200       | 0.02              |                             |                         | 7070             |             |                         | 10700            |             |               |
| MAR          | 23                    | 198                  | 4.3         | 3900       | 0.05              |                             |                         | 6100             |             |                         | 9100             |             |               |
| APR          | 9                     | 155                  | 3.2         | 4400       | 0.06              |                             |                         | 7200             |             |                         | 7400             |             |               |
| MAY          | 19                    | 150                  | 4.1         | 3500       | 0.29              |                             |                         | 8300             |             |                         | 6500             |             |               |
| JUNE         | 13                    | 186                  | 5.8         | 6500       | 0.10              |                             |                         | 8200             |             | 9.0                     | 7000             |             | 53            |
| JULY         | 12                    | 118                  | 4.9         | 5800       | 0.10              |                             |                         | 6300             |             | 10.0                    | 8000             |             | 59            |
| AUG          | 6                     | 160                  | 6.5         |            |                   |                             |                         | 8600             |             | 12.0                    | 10500            |             | 71            |
| SEPT         | 16                    | 146                  | 6.2         | 5900       | 0.03              |                             |                         | 4000             |             | 13.0                    | 14600            |             | 77            |
| OCT.         | 11                    | 152                  | 6.9         | 5000       | 0.03              |                             |                         | 7700             |             | 14.0                    | 16200            |             | 83            |
| NOV          | 9                     | 144                  | 7.7         | 6900       |                   |                             |                         | 4100             |             | 12.0                    | 6100             |             | 71            |
| DEC          | 7                     | 130                  | 6.6         | 5000       | 0.03              |                             |                         | 9000             |             | 18.0                    | 8700             |             | 107           |
| <b>TOTAL</b> | <b>150</b>            | <b>1760</b>          | <b>-</b>    | <b>-</b>   | <b>-</b>          | <b>-</b>                    | <b>-</b>                | <b>-</b>         | <b>-</b>    | <b>88.0</b>             | <b>-</b>         | <b>-</b>    | <b>521</b>    |
| AVG.         | 4.3<br>cu. ft/mil gal | 147                  | 5.0         | 5200       | 0.08              |                             |                         | 6900             |             | 13.0                    | 9300             |             | 74            |

## **WATER SUPPLY SYSTEM**



## DESIGN DATA

PROJECT NO. 6-0093-61

TREATMENT Coagulation and Filtration

### FILTERS

Type: Pressure, sand.

Size: 84 inch dia

### SOURCE

- Bonnechere River

### DISTRIBUTION

6" and 8" dia pipe

### PUMP

One Canada Pump 167 igpm @ 210' TDH

# '73 Review

## GENERAL

The water consumption dropped slightly during 1973 as a result of summer use restrictions, monitoring of the distribution system for leaks, and effecting rapid leak repair.

At the water treatment plant, the water distribution pump was overhauled and a footing drain system was installed.

Five new water services, and one extension were provided and one water main break was repaired.

## EXPENDITURES

The cost of operating the water system in 1973 was \$8,167, a reduction from \$10, 319 in 1972. The cost of treating and distributing one million gallons of water averaged \$360.

## PLANT PERFORMANCE AND TREATMENT DATA

Flows for the year totalled 22.75 million gallons or 62 thousand gallons per day as compared to 65 thousand gallons per day in 1972 and 78 thousand gallons per day in 1971.

A total of 1883 pounds of alum was used to coagulate the raw water to improve the filtration effectiveness, and a total of 763 gallons of sodium hypochlorite was used to disinfect the treated water before pumping it into the distribution system

A very high quality water resulted with only 3 of the 218 plant effluent and distribution system samples showing any sign of incomplete disinfection.

## PLANT LOADING

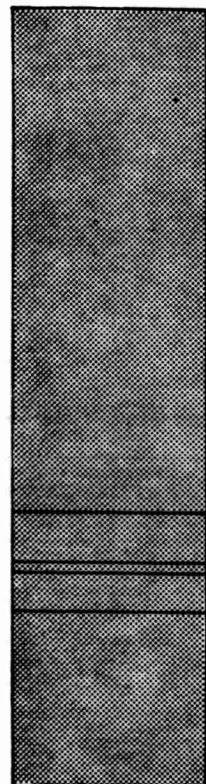
Flows during 1973 averaged 25 per cent of maximum plant capacity, limited by the filters, of approximately 250, 000 gallons per day. The maximum day flow was 46 per cent of maximum plant capacity. However, the maximum plant capacity is presently limited by the size and condition of the distribution pumps, and by the fact that there is no reservoir of water which can be drawn upon for peak requirements, and refilled during periods of low flow.

## CONCLUSIONS

The elevated tank to be constructed in 1974 plus modifications to the distribution pumps and piping arrangement in the plant will each improve the plant capacity. When this work is completed low-pressure problems during periods of peak flow will be alleviated, and maintenance of the plant components will be possible without interfering with the supply of water.

The plant staff have worked conscientiously to keep the system in good condition and provide a high standard of service.

# ANNUAL COSTS



## 1973 OPERATING COSTS

|  |      |
|--|------|
| SALARIES & WAGES                           | 65 % |
| EMPLOYEE BENEFITS                          | 7 %  |
| TRANSPORTATION & COMMUNICATIONS            | <1 % |
| SERVICES                                   | 6 %  |
| SUPPLIES & EQUIPMENT                       | 22 % |
| AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS |      |
| TRANSFER PAYMENTS                          |      |
| OTHER TRANSACTIONS                         |      |

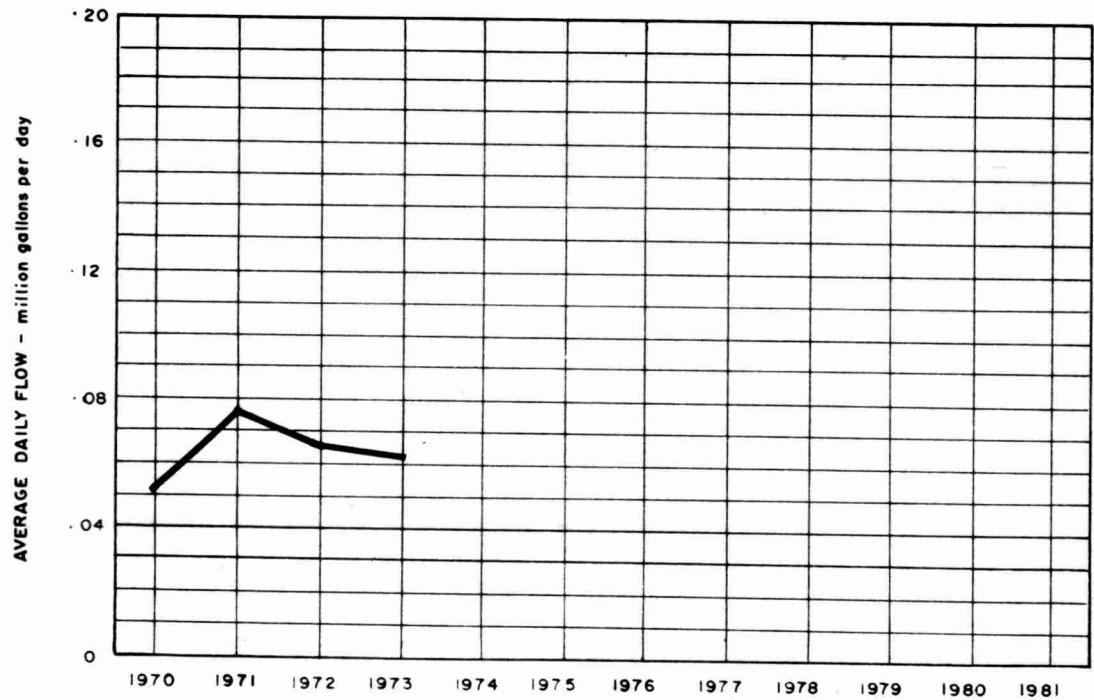
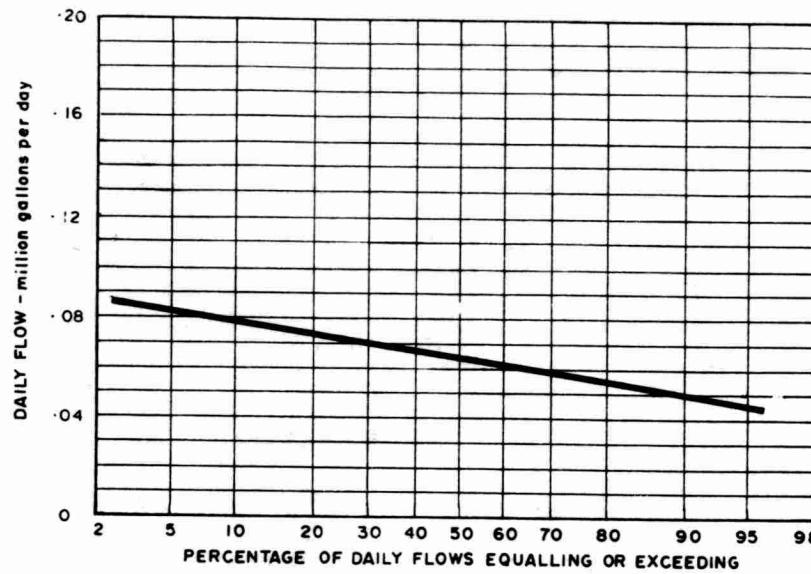
## YEARLY OPERATING COSTS

| YEAR | WATER TREATED<br>in million gallons | TOTAL<br>OPERATING COSTS | UNIT COSTS          |
|------|-------------------------------------|--------------------------|---------------------|
|      |                                     |                          | cents per 1000 gal. |
| 1972 | 24.17                               | \$ 10,319                | 43                  |
| 1973 | 22.75                               | 8,168                    | 36                  |

## OPERATING EXPENDITURES

|   |         |
|---|---------|
| SALARIES AND WAGES                          | \$ 5300 |
| EMPLOYEE BENEFITS                           | 530     |
| TRANSPORTATION & COMMUNICATIONS             | 48      |
| SERVICES                                    | 520     |
| SUPPLIES AND EQUIPMENT                      | 1770    |
| ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS | 0       |
| TRANSFER PAYMENTS                           | 0       |
| OTHER TRANSACTIONS                          | 0       |
| TOTAL                                       | \$ 8168 |

# PROCESS DATA FLOWS



DESIGN CAPACITY 0.25

## PLANT PERFORMANCE

| MONTH | FLOWS                                    |  |  | ALUM                     |                | CHLORINATION                              |                |  | TEMPERATURE    |                |
|-------|--|--|--|--------------------------|----------------|---|----------------|--|----------------|----------------|
|       | TOTAL<br>PLANT OUTPUT<br>million gallons | AVERAGE<br>DAILY FLOW<br>million gallons | MAXIMUM<br>DAY'S FLOW<br>million gallons | AMOUNT<br>USED<br>pounds | DOSAGE<br>mg/l | SODIUM<br>HYPOCHLORITE<br>USED<br>gallons | DOSAGE<br>mg/l | RESIDUAL<br>IN PLANT<br>EFFLUENT<br>mg/l | AVERAGE<br>° F | MAXIMUM<br>° F |
| JAN   | 1.96                                     | 0.063                                    | 0.080                                    | 104                      | 5.3            | 56  | 3.4            | 0.5                                      | 27             | 27             |
| FEB   | 2.03                                     | 0.073                                    | 0.087                                    | 116                      | 5.7            | 48  | 2.8            | 0.5                                      | 27             | 27             |
| MAR   | 1.81                                     | 0.058                                    | 0.071                                    | 108                      | 6.0            | 42  | 2.8            | 0.5                                      | 29             | 33             |
| APR   | 1.65                                     | 0.055                                    | 0.069                                    | 92                       | 5.6            | 44  | 3.2            | 0.5                                      | 35             | 40             |
| MAY   | 1.84                                     | 0.060                                    | 0.076                                    | 109                      | 5.9            | 58  | 3.8            | 0.5                                      | 46             | 54             |
| JUNE  | 1.74                                     | 0.058                                    | 0.071                                    | 157                      | 9.0            | 73  | 5.1            | 0.5                                      | 63             | 68             |
| JULY  | 2.25                                     | 0.073                                    | 0.116                                    | 224                      | 12.0           | 95  | 5.1            | 0.5                                      | 70             | 72             |
| AUG   | 1.92                                     | 0.062                                    | 0.104                                    | 293                      | 15.0           | 82  | 5.1            | 0.5                                      | 69             | 72             |
| SEPT  | 1.87                                     | 0.062                                    | 0.080                                    | 252                      | 14.0           | 80  | 5.1            | 0.5                                      | 59             | 76             |
| OCT   | 1.85                                     | 0.060                                    | 0.078                                    | 192                      | 10.0           | 67  | 4.3            | 0.5                                      | 48             | 54             |
| NOV   | 1.91                                     | 0.063                                    | 0.076                                    | 165                      | 8.6            | 51  | 3.2            | 0.5                                      | 31             | 40             |
| DEC   | 1.92                                     | 0.062                                    | 0.072                                    | 187                      | 9.3            | 67  | 4.2            | 0.5                                      | 29             | 30             |
| TOTAL | 22.75                                    |  |  | 1883                     |                | 763                                       |                |  |                |                |
| AVG.  |  | 0.062                                    | MAXIMUM<br>0.116<br>pounds per day       | 5                        | 8.3            | 2<br>gallons per day                      | 4.0            | 0.5                                      | 44             | MAXIMUM<br>76  |

## CHLORINATION and DISINFECTION

| MONTH | RAW WATER   |       |        |          |       | PLANT<br>EFFLUENT                |   | DISTRIBUTION<br>SYSTEM           |   |
|-------|---|-------|--------|----------|-------|----------------------------------|---|----------------------------------|---|
|       | NUMBER OF SAMPLES HAVING<br>TOTAL COLIFORM ORGANISMS PER 100 mL<br>OF |       |        |          |       | NUMBER<br>OF<br>SAMPLES<br>TAKEN | NUMBER<br>HAVING<br>COLIFORM<br>ORGANISMS | NUMBER<br>OF<br>SAMPLES<br>TAKEN | NUMBER<br>HAVING<br>COLIFORM<br>ORGANISMS |
|       | 0   | 1 - 3 | 4 - 32 | 33 - 320 | > 320 |                                  |   |                                  |   |
| JAN   | 5   | 0     | 0      | 0        | 0     | 20                               | 0   | 0                                | 0   |
| FEB   | 3   | 0     | 0      | 0        | 0     | 12                               | 0   | 0                                | 0   |
| MAR   | 5   | 0     | 0      | 0        | 0     | 20                               | 0   | 0                                | 0   |
| APR   | 4   | 0     | 0      | 1        | 3     | 20                               | 0   | 12                               | 0   |
| MAY   | 3   | 0     | 1      | 1        | 0     | 20                               | 0   | 0                                | 0   |
| JUNE  | 4   | 0     | 0      | 0        | 0     | 14                               | 2   | 0                                | 0   |
| JULY  | 5   | 0     | 0      | 0        | 0     | 20                               | 0   | 0                                | 0   |
| AUG   | 3   | 0     | 0      | 1        | 0     | 16                               | 0   | 0                                | 0   |
| SEPT  | 1   | 0     | 1      | 1        | 0     | 12                               | 0   | 0                                | 0   |
| OCT   | 5   | 0     | 0      | 0        | 2     | 20                               | 0   | 0                                | 0   |
| NOV   | 3   | 0     | 0      | 0        | 0     | 16                               | 0   | 5                                | 0   |
| DEC   | 3   | 0     | 0      | 0        | 0     | 11                               | 1   | 0                                | 0   |
| TOTAL | 44  | 0     | 2      | 4        | 5     | 201                              | 3   | 17                               | 0   |
| Avg.  | 3<br>(NOTE - Average shown is the GEOMETRIC MEAN)                     |       |        |          |       |                                  |   |                                  |   |

## WATER QUALITY

| PROPERTY                                       | RAW WATER         |         |         |         | TREATED WATER     |         |         |         | DESIRABLE STANDARDS |
|--|-------------------|---------|---------|---------|-------------------|---------|---------|---------|---------------------|
|  | NUMBER OF SAMPLES | AVERAGE | MAXIMUM | MINIMUM | NUMBER OF SAMPLES | AVERAGE | MAXIMUM | MINIMUM |                     |
| HARDNESS<br>in mg/l as $\text{CaCO}_3$         | 11                | 56      | 70      | 46      | 2                 | 64      | 66      | 62      | 80 - 100            |
| ALKALINITY<br>in mg/l as $\text{CaCO}_3$       | 11                | 42      | 52      | 36      | 2                 | 48      | 48      | 48      | 30 - 100            |
| IRON<br>in mg/l Fe                             | 11                | 0.13    | 0.20    | 0.10    | 2                 | 0.08    | 0.10    | 0.05    | Less than 0.3       |
| CHLORIDE<br>in mg/l $\text{Cl}^-$              | 11                | 6       | 8       | 5       | 2                 | 6       | 6       | 6       | Less than 250       |
| pH<br>in pH units                              | 11                | 7.5     | 7.9     | 7.3     | 2                 | 7.5     | 7.6     | 7.4     | 7.0 - 8.5           |
| CONDUCTIVITY<br>in micromhos per $\text{cm}^3$ | 3                 | 143     | 155     | 136     | 2                 | 138     | 140     | 137     |                     |

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